

## Network Modelling of Transboundary Cooperation between Russian and Belarusian Regional Enterprises: the case of the Kaliningrad and Grodno Regions

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**NETWORK MODELLING  
OF TRANSBORDER  
COOPERATION  
BETWEEN RUSSIAN  
AND BELARUSIAN  
REGIONAL ENTERPRISES:  
THE CASE  
OF THE KALININGRAD  
AND GRODNO REGIONS**

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***Yu. Misiyuk\****



*This article examines the development of a new process within Russian-Belarusian-Kazakh integration — interregional transborder cooperation. Network modelling is suggested as a mechanism for its regulation. The authors present a network model of transborder cooperation between the Russian Federation and the Republic of Belarus based on the case of the Kaliningrad and Grodno regions.*

*The model is developed on the basis of the well-known and widely accepted PERT. It covers the three main stages of the whole transborder cooperation process identified in the case of the two regions — the Kaliningrad and Grodno: organisational and analytical support, methodological and technological support, and the development of a complex cooperation programme. The working version of the model includes approximately 150 events. As to its purpose, it is a representation of a well-balanced established international coordination programme of transboundary cooperation at a level of two regions.*

**Key words:** transborder cooperation, network model of a programme, interregional transborder cooperation, expected model efficiency

The modern stage of Russian economic development is marked by a strengthening of integration process in the post-war space. The customs union of Russia, Belarus, and Kazakhstan has been established; a lot is being done towards the complete economic integration of the countries.

A closer economic transborder interaction between the three states resulted in the expansion of immediate cooperation between their regions and economic entities in view of the economic interests of each region. Such cooperation is based, first of all, on the system of intergovernmental ag-

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reements in the framework of the Customs Union. At the same time, the transition to the regional level does require taking into account the regional features of each party, which must be reflected in interregional international agreements. The relevance of such form of transborder cooperation is evident to all participating regions. The following positive results are expected to be achieved in the course of such cooperation:

- an increase in the economic stability of regional development, including that of small enterprises;
- mutual expansion of goods and services markets; a faster innovative development of regional economies;
- a better adaptation to the WTO conditions;
- an increase in economy's resistance to the expected new wave of economic crisis, etc.

At the stage of international regional transborder cooperation development, various problems, which impede this process, emerge. Their solution requires research and practical groundwork.

One of such problems coming to the foreground is the need to model the processes of integral programming of transborder regional cooperation, first of all, between the countries that have formed the Customs Union in the post-Soviet space.

The Immanuel Kant Baltic Federal University carries out a research on the improvement of management of transboundary cooperation and interregional international transboundary cooperation processes on the basis of network management methodology (a tool of project management). As a platform for such research, IKBFU scholars chose the cooperation between the Kaliningrad and Grodno regions, which is developing in the framework of Russia-Belarus interregional processes. A considerable contribution to this study was made by IKBFU's professor N. F. Sergievich.

A specific feature of the cooperation under investigation is that it is carried out via the territory of a third country — Lithuania. It is gaining momentum through involving new areas of economic, social, and cultural cooperation. The table shows the basic areas and types of cooperation between the Kaliningrad and Grodno regions. It is of general nature, but demonstrates the scope of activities with sufficient detail.

**The matrix of transboundary cooperation between the Kaliningrad and Grodno regions**

Field of interaction	Area of cooperation			
	Industry and agro-industry	Transport	Trade	Social and humanitarian interaction
1. Furniture industry	+			
2. Agro-industry, including fishery	+			
3. Trade in dairy and fish products			+	
4. Trade in agricultural products			+	

*End of table*

Field of interaction	Area of cooperation			
	Industry and agro-industry	Transport	Trade	Social and humanitarian interaction
5. Trade in light industry produce			+	
6. Trade in chemical products			+	
7. Motor traffic		+		
8. Railway traffic		+		
9. Air traffic		+		
10. Secondary and higher education, including PhD studies				+
11. Healthcare, including pharmaceuticals				+
12. Cultural ties				+

Speaking of the positive aspects of regional cooperation, one cannot but mention its shortcomings, which slow down and, in certain cases, impede its development. The research conducted shows that the basic complications in organising this process are as follows:

- an insufficient analysis of the course of cooperation by both parties;
- insufficient harmonisation of the Kaliningrad and Grodno regions' regulations on cooperation in view of the specific features of regional economies and markets;
- the lack of a clear-cut integral programme for transboundary cooperation;
- insufficient cooperative monitoring and coordination of cooperation initiatives.

The analysis shows that these drawbacks are of a general nature and characteristics of other regions involved in transborder international cooperation. The national and international body of research shows that the overcoming of the mentioned drawbacks and efficient management of the whole process at the regional level requires preliminary development of standard models of such cooperation programmes.

A conceptual approach to modelling interregional transboundary cooperation helps formulate its basic conditions:

- a system approach to the whole process;
- a clear formulation of the basic targets and objectives;
- the structuring of the whole process and programme;
- the identification of typical programme initiatives and the formalisation of transboundary cooperation programme as a network model;

— an iterative approach to managing network models of the transboundary cooperation programme.

To date, modern management science has gained wide research and methodological experience of modelling networks and managing programmes for different purposes and of different scopes. Being a tool of project management, these models form the system-building core for managing interregional transboundary cooperation. They help establish a clear logical connection between numerous actions and identify a set of the leading (so called critical) works, which allows programme coordinators to make rational managerial decisions, for any given time period.

The modelling of transboundary cooperation models has another important function — it increases the stability of the economy of the region participating in international transboundary cooperation. In his works on the subject, Dr M. V. Bilchak emphasises that the stimulation of industries ensuring a stable functioning of the region should be conducted, primarily, through the priority support for competitive enterprises and industries producing competitive goods and services, first of all, in external markets. He described the basic elements of the mechanism for stable functioning of a border region's economy, which is equally suitable for a region participating in transboundary cooperation. Such elements include:

- the development of promising economic specialisations and centres of economic growth;
- support for the utilities industry;
- support for the industries of stable functioning;
- the creation of conditions for economic activation.

This list can be extended to include such important factor as an increase in the stability of SMEs.

The use of network modelling programmes for transborder interregional cooperation in order to increase the stability of regional economies is immediately connected to the assessment of the models' reliability. Such assessment should be carried out at the stages of both model development and implementation, which is of special importance to such vulnerable sector of the economy as small and medium business. In general, the reliability of international transborder interregional cooperation can be interpreted as the capacity of such model to accurately reflect managerial processes over a certain period with a minimum number of failures of its elements. The methodological framework for assessing the reliability of special purpose network models is being developed at the moment, which creates conditions necessary for drawing up similar methodologies for building transboundary cooperation models.

During an information and logical analysis of the transborder cooperation between the Kaliningrad region of the Russian Federation (KR) and the Grodno region of the Republic of Belarus (GR), the programme-target methodology helped structure this cooperation, identify its primary objective and principal areas, as well as typical programme initiatives. As a result, a tree of objectives was drawn to illustrate the model of a programme for Kaliningrad-Grodno transboundary cooperation (fig. 1).

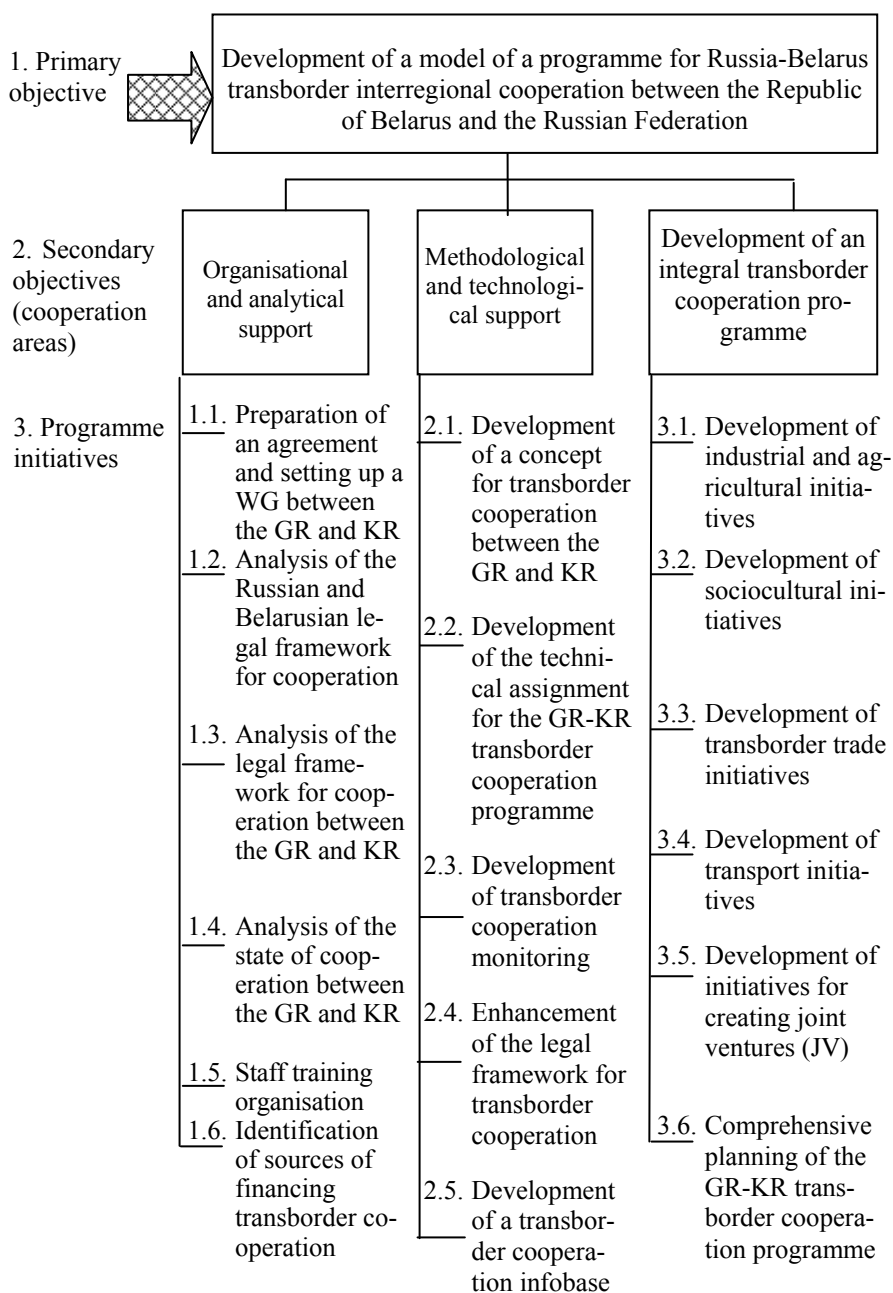


Fig. 1. A basic scheme of structuring the development of regional cooperation between the Republic of Belarus and the Russian Federations: the case of the Grodno and Kaliningrad regions

The structuring helped identify three secondary objectives (cooperation areas):

- 1) organisational and analytical support;
- 2) methodological and technological support;
- 3) development of an integral transboundary cooperation programme

During the construction and analysis of the three of objectives, 17 generalised programme initiatives were identified; at the working stage, this number will increase to approximately 120. They underlie the construction of an initial (generalised) model of transborder cooperation programme. The information and logical analyses helped establish connections between the programme initiatives; the programme evaluation and review technique (PERT) was used to design a generalised network model for the whole-process programme (fig. 2). The initial database is developed on the basis of expert evaluations of initiative implementation duration to ensure its practical application. At the same time, PERT-based deterministic evaluations are transformed into probabilistic ones according to the formula:

$$Te(ij) = \frac{te + 4tmp + tp}{6},$$

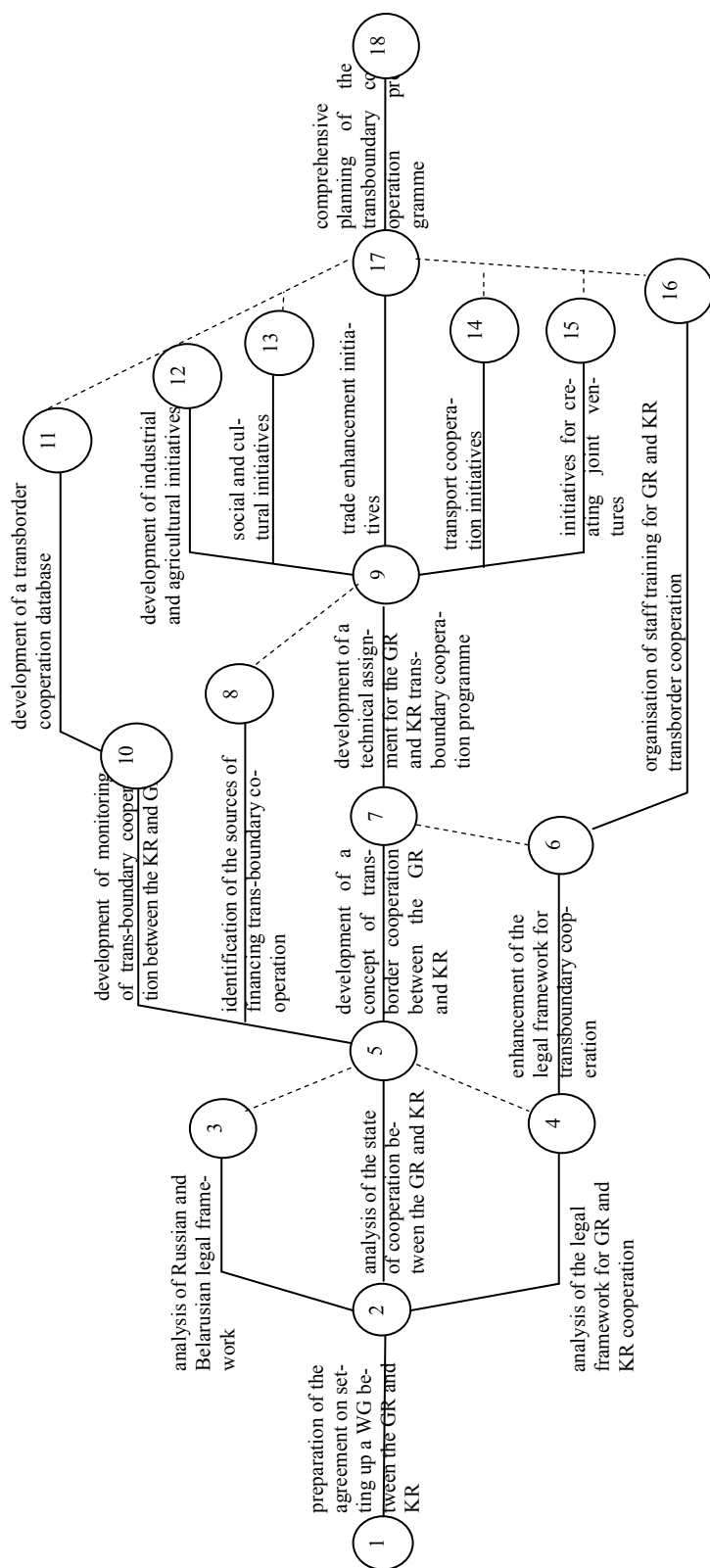
where  $te$  is the optimistic evaluation;

$tp$  — the pessimistic evaluations;

$tmp$  — the most probable evaluation in case only one temporary evaluation of the programme initiative implementation is required.

When choosing the necessary (i.e. the most convenient) algorithm for network model analysis, one uses it to calculate all parameters, the principal one of which is the *critical path of works* (i.e. programme initiatives). In the process of system application of the network model of the programme, the critical path of works helps the regional administration make decisions on managing the whole process of interregional cooperation. Experimental works aimed at constructing and analysing the network model of transboundary interregional cooperation carried out for the case of the KR and GR proved their appropriateness, as well as feasibility. These models have great potential for increasing the efficiency of management system in this field of foreign economic activity. It is sufficient to mention the fact that, according to literary sources, the application of network models in different areas of research, production, and foreign economic activities helps decrease the general duration of programme implementation by up to 25 % against the background of implementation cost reduction by 15 %.

In conclusion, one must emphasise that the basic condition for a successful application of the network modelling of interregional transboundary cooperation programmes is an intensive and large-scale training of staff for regional government municipalities in the field of basic project and network management. The experience shows that the often insufficient level of training in this field can reduce the efficiency of managing these processes.



*Abbreviations:* WG — interregional workgroup; GR — the Grodno region of the Republic of Belarus; KR — the Kaliningrad region of the Russian Federation.

Fig. 2. A conceptual model of developing a programme for transborder regional cooperation between the Republic of Belarus and the Russian Federation: the case of the Grodno and the Kaliningrad regions (developed with the help of N.F. Sergievich)



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